UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

30 JUN 2017

Mr. Jon Tack, Chief
Iowa Department of Natural Resources
Water Quality Bureau
502 E. 9th Street
Des Moines, Iowa 50319-0034

Dear Mr. Tack:

The U.S. Environmental Protection Agency has completed its Clean Water Act review of the new and revised water quality standards that the Iowa Department of Natural Resources submitted to the EPA by letter dated March 31, 2017. The EPA received this submission on April 6, 2017. The revisions to Iowa's rules at 567 IAC Chapter 61 WQS consist of adopting new methods by which the State may calculate site-specific copper criteria, using either the Copper Biotic Ligand Model (BLM), as described in a rule-referenced document titled *Implementation Procedures for the Site-Specific Application of Copper Biotic Ligand Model,* or Water-Effect Ratios that modify Iowa's existing hardness-based copper criterion. The revisions to Chapter 61 were adopted by the State on February 22, 2017, and were certified by the Attorney General on March 9, 2017, as adopted pursuant to Iowa law.

Under CWA section 303(c), 33 U.S.C. 1313(c), and the EPA's implementing regulations at 40 CFR § 131.4, states have the primary responsibility for reviewing, establishing, and revising WQS, which include the designated uses of a waterbody or waterbody segment and the water quality criteria necessary to protect those designated uses. Such criteria must be based on a sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. CWA section 303(c) also requires states to submit new or revised WQS to the EPA for review, as the EPA must ensure that those WQS are consistent with the CWA and the EPA's implementing regulations.

In addition to the EPA's review pursuant to Section 303 of the CWA, Section 7(a)(2) of the Endangered Species Act, requires federal agencies, in consultation with the U.S. Fish and Wildlife Service, to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species. The EPA's decision to approve these new and revised WQS in Iowa is subject to the results of consultation under Section 7 of the ESA with the USFWS. The EPA initiated informal consultation with the USFWS on April 28, 2017, and will notify IDNR of the results of the Section 7 consultation upon completion.

A summary of the EPA's actions is provided below and further described in the enclosed document.

The EPA's Decision Summary

This letter addresses elements in the state's WQS submittal, all bearing on the calculation and application of site-specific criteria for the protection of aquatic life in Iowa's waters. Pursuant to the

EPA's authority under CWA Section 303(c) and implementing regulations found at 40 C.F.R Part 131, the EPA is approving the following provisions:

- Item 1. Amend subrule **61.3(3), TABLE 1**, Criteria for Chemical Constituents, parameter for copper, as follows:

Copper	Chronic[(n)]	20	--	16.9(i)	16.9(i)	16.9(i)	10	--	--
	Acute[(n)]	30	--	26.9(i)	26.9(i)	26.9(i)	20	--	--
	Human Health+-- Fish	--	--	--	--	--	--	--	1000(e)
	Human Health+-- F & W	--	--	--	--	--	--	--	1300(f)

- Item 2. Adopt the following **new** footnote (n) in subrule **61.3(3),** TABLE 1, Criteria for Chemical Constituents:

  (n) The copper criteria in Table 1 can be adjusted by a Water-Effect Ratio (WER). The WER factor is equal to 1.0 unless an approved WER has been conducted by a permittee for a specific point source. The WER study shall be conducted in accordance with the "Interim Guidance on Determination and Use of Water-Effect Ratios for Metals (EPA-823-B-94-001), February 22, 1994," or upon approval by the department, the "Streamlined Water-Effect Ratio Procedure of Discharges of Copper (EPA-822-R-01-005), March 2001," which are hereby adopted by reference.

  The copper Biotic Ligand Model (BLM) may be used as an alternative to the copper criteria in Table 1. The copper BLM is found in the document "Aquatic Life Ambient Freshwater Quality Criteria – Copper 2007 Revision (EPA-822-R-07-001), February 2007," which is hereby adopted by reference.

- Item 3. Reserve subrule **61.3(9).**

- Item 4. Adopt the following **new** subrule **61.3(10)**:
  61.3(10) *Implementation Procedure for Biotic Ligand Model-Based Copper Criteria.* The department hereby incorporates by reference "Implementation Procedure for Biotic Ligand Model-Based Copper Criteria, February 22, 2017." This document may be obtained on the department's Web site.

The copper BLM has been the EPA's 304(a) recommended freshwater aquatic life criteria for copper since 2007 (see *Aquatic Life Ambient Freshwater Quality Criteria – Copper 2007 Revision*). Iowa has adopted the 2007 BLM and a procedure that considers all of the necessary steps to ensure the BLM is used to calculate protective site-specific copper criteria. The EPA has completed its review of subrule 61.3(3) Table 1, footnote (n), and subrule 61.3(10), and finds that the adoption of these provisions comports with the requirements of CWA section 303(c) and 40 CFR 131, and hereby approves these provisions. This approval provides the state with options and flexibility for calculating and implementing site-specific copper criteria.

The EPA appreciates the efforts that the state will make to fully inform the public about the calculation of site-specific criteria for copper. In its BLM *Implementation Procedures* document, the IDNR stated:

"The Sites where copper BLM based criteria have been developed will be published on the IDNR website."

In the interest of transparency and consistency, the EPA expects the IDNR to also publish on its website the location of sites where WER-based copper criteria have been developed.

We would like to commend you and your staff on the significant efforts to update Iowa's WQS by adopting the nationally recommended freshwater aquatic life criteria for copper. We appreciate Iowa's continuing efforts to protect and restore water quality and its overall commitment to review and revise WQS and keep them up to date.

If you have any questions or comments regarding the EPA's action today, please contact me at (913) 551-7146, or have a member of your staff contact John DeLashmit, Chief, Water Quality Management Branch, at (913) 551-7821.

Sincerely,

Jeffery Robichaud
Acting Director
Water, Wetlands and Pesticides Division

Enclosure

Decision Document of the U.S. Environmental Protection Agency Review of Iowa's Water Quality Standards Revisions in rules at 567 IAC Chapter 61 Under Section 303(c) of the Clean Water Act

INTRODUCTION

In a letter dated March 31, 2017, the Iowa Department of Natural Resources submitted new and revised water quality standards to the U.S. Environmental Protection Agency for review under section 303(c) of the Clean Water Act. The EPA received the submission from the IDNR on April 6, 2017. The WQS submission includes new methods by which the State may calculate site-specific copper criteria, using either the Copper Biotic Ligand Model (BLM), as described in a rule-referenced document titled *Implementation Procedures for the Site-Specific Application of Copper Biotic Ligand Model (Implementation Procedures),* or Water-Effect Ratios (WERs) that modify Iowa's existing hardness-based copper criterion. Specifically, the new and revised WQS are:

- Item 1. Amend subrule **61.3(3)**, **TABLE 1**, Criteria for Chemical Constituents, parameter for copper, as follows:

Copper	Chronic[(n)]	20	--	16.9(i)	16.9(i)	16.9(i)	10	--	--
	Acute[(n)]	30	--	26.9(i)	26.9(i)	26.9(i)	20	--	--
	Human Health+-- Fish	--	--	--	--	--	--	--	1000(e)
	Human Health+-- F & W	--	--	--	--	--	--	--	1300(f)

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  The copper Biotic Ligand Model (BLM) may be used as an alternative to the copper criteria in Table 1. The copper BLM is found in the document "Aquatic Life Ambient Freshwater Quality Criteria – Copper 2007 Revision (EPA-822-R-07-001), February 2007," which is hereby adopted by reference.

- Item 3. Reserve subrule **61.3(9).**

- Item 4. Adopt the following **new** subrule **61.3(10)**:

61.3(10) *Implementation procedure for biotic ligand model-based copper criteria.* The department hereby incorporates by reference "Implementation Procedure for Biotic Ligand Model-Based Copper Criteria, February 22, 2017." This document may be obtained on the department's Web site.

CLEAN WATER ACT REQUIREMENTS

Under CWA section 303(c), 33 U.S.C. 1313(c), and the EPA's implementing regulations at 40 CFR § 131.4, states have the primary responsibility for reviewing, establishing, and revising WQS, which include the designated uses of a waterbody or waterbody segment and the water quality criteria necessary to protect those designated uses. Such criteria must be based on a sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. CWA section 303(c) also requires states to submit new or revised WQS to the EPA for review, as the EPA must ensure that those WQS are consistent with the CWA and the EPA's implementing regulations.

General Recommended Approach for Deriving Aquatic Life Criteria

Under the EPA's CWA section 304(a) authority, the EPA develops and publishes methodologies and recommended water quality criteria to protect aquatic life and human health (referred to as 304(a) criteria recommendations), and periodically reviews and revises those methodologies and criteria. The methodologies and criteria are subject to public as well as expert scientific review before the EPA issues them as formal agency recommendations for states to consider when developing and adopting water quality criteria pursuant to CWA Section 303(c).

To derive criteria for the protection of aquatic life, the EPA follows its *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses ("1985 Guidelines").* These guidelines describe an objective way to estimate the highest concentration of a substance in water that will not present a significant risk to the aquatic organisms in the water. Numeric criteria derived using the EPA's *1985 Guidelines* are expressed as short-term (acute) and long-term (chronic) values. The combination of a criterion maximum concentration (CMC, a one-hour average value), and a criterion continuous concentration (CCC, a four-day average value), is intended to protect aquatic life from acute and chronic toxicity, respectively. Neither value is to be exceeded more than once in three years. When the EPA revises existing 304(a) criteria recommendations, it incorporates new data about species' chronic and acute sensitivity as well as new scientific knowledge about toxicity pathways.

The development of water quality criteria for certain pollutants may be based on certain water characteristics (e.g., pH, temperature, hardness, dissolved organic carbon (DOC), etc.), since water chemistry can influence a pollutant's bioavailability and toxicity.

National 304(a) Recommended Criteria for Copper

Prior to 2007, the EPA used hardness as an indicator of the site water chemistry, and published criteria recommendations for copper that were equations where the resulting copper values depended on the level of hardness in the water. The hardness-based equation accounts for only

one of the many variables affecting bioavailability of copper in real world conditions, and that variable (hardness) is less strongly predictive of copper bioavailability than pH and dissolved organic carbon content. Therefore, hardness-based copper criteria may not be protective enough under some conditions due to the lack of consideration of the full range of water chemistry parameters of relevance.

Because the hardness-based equation may misrepresent the bioavailability of copper and its toxicity, the EPA recognized a need for an approach that (l) explicitly and quantitatively accounted for the effect of individual water quality parameters that modify metal toxicity and (2) could be applied more cost-effectively and easily, and hence more frequently, across spatial and temporal scales.

To meet those goals, the EPA developed and issued the 2007 revised recommended copper criteria using the BLM. The EPA's 2007 *BLM Criteria Document* incorporated the latest scientific information, including updated toxicity information for six sensitive species *(Ceriodaphnia dubia, Lithoglyphus virens, Scaphofeberis sp., Actinonaias pectorosa, Hyalella azteca, and Juga plicifera),* which include a freshwater mussel.

ADDITIONAL EPA GUIDANCE FOR SITE-SPECIFIC CRITERIA FOR COPPER

In 1994, the EPA issued guidance for developing site-specific metals criteria using the WER *[Interim Guidance on Determination and Use of Water-Effect Ratios for Metals* (EPA-823-B-94-001), February 1994], and a subsequent clarification [*Use of the WER Procedure with Hardness Equations,* December 1997]. The WER is a biological method that accounts for any difference that exists between the toxicity of a pollutant in laboratory dilution water and its toxicity in site water. A copper WER study results in identifying a "multiplier" that is used to modify the underlying hardness-based copper criterion, ultimately resulting in a site-specific criterion that reflects the water chemistry conditions present at the site only at the time of sampling. The EPA recommended use of the WER to provide for site-specific adjustments to copper criteria that account for variations in water chemistry other than hardness. The Agency developed a streamlined copper WER process to supplement the 1994 guidance [*Streamlined Water-Effect Ratio Procedure for Discharges of Copper,* (EPA-822-R-01-005), March 2001], but this streamlined process was recommended for use *only* where copper concentrations are elevated primarily by continuous point source effluents.

The EPA addressed the limitations of copper WERs in the 2007 *Federal Register* notice announcing the availability of the BLM-based copper criterion, "Where used, the application of the BLM will replace the need for site-specific modifications, such as the Water Effect Ratio, to account for site-specific chemistry influences on metal toxicity." [72 FR 7983- 7985, February 22, 2007]. In fact, the Agency spoke to the copper BLM's advantages over the WER as early as 2001 in the EPA's streamlined WER guidance for copper, in which it stated that the BLM was, "ultimately intended to replace the WER toxicity tests for copper." Anticipating the eventual primacy of the BLM, the streamlined WER guidance also recommends sampling for parameters used in BLM calculations to allow for future use of the BLM to calculate site-specific criteria.

Although the WER, when used correctly, can be an appropriate tool for adjusting hardness-based results to account for bioavailability, the BLM has several advantages over the WER for use in calculating site-specific aquatic life criteria for copper. The BLM adds value by addressing the influence of both biotic and abiotic (organic and inorganic) ligands in the calculation of the bioavailability of metals to aquatic organisms over a broader range of conditions than the WER. The EPA's Science Advisory Board (SAB) concluded in its 2000 review that the BLM can "significantly improve predictions of the acute toxicity of certain metals across an expanded range of water chemistry parameters compared to the WER." [*An SAB Report: Review of the Biotic Ligand Model of the acute toxicity of metals,* (EPA-SAB-EPEC-00-006), February, 2000]. After the SAB released its report, the Agency further refined the BLM and incorporated the BLM as the 2007 national 304(a) recommended freshwater aquatic life criteria for copper.

IOWA'S ADOPTION OF THE COPPER BLM

As noted above, Iowa's submission includes adoption of the copper BLM, along with a rule-referenced document titled *Implementation Procedures for the Site-Specific Application of Copper Biotic Ligand Model (Implementation Procedures)*. Iowa's new footnote (n) references the EPA's 2007 304(a) national recommended criteria for copper (the copper BLM). Additionally, Iowa's *Implementation Procedures* document presents detailed considerations of how Iowa will use the BLM to calculate copper criteria by site. The document explains how Iowa will 1) determine the "site" to which the site-dependent copper criteria apply, 2) consider spatial and temporal variability at the site when determining BLM input data, and 3) reconcile outputs from the BLM to ensure that aquatic life is protected when copper is most bioavailable at the site. These considerations are consistent with the information in the EPA's 2007 *Supplementary Training Materials for Aquatic Life Criteria – Copper*.[1] Iowa presents a limited number of decisions that the state will make based on site-specific information, but notes several times in the document that the overarching concern is that "the criteria selected must be protective of the entire Site."

Iowa's adoption of the 2007 copper BLM ensures that Iowa will be able to calculate site-specific copper criteria using the latest science to protect aquatic life. The considerations outlined in Iowa's binding BLM *Implementation Procedures* document ensure that Iowa's adoption of the BLM is reasonably consistent with the definition of a "performance-based approach," as articulated in the preamble to the "Alaska Rule" (65 FR 24641): "A performance-based approach relies on adoption of a process (*i.e.,* a criterion derivation methodology) rather than a specific outcome (*i.e.,* concentration limit for a pollutant) consistent with 40 CFR 131.11 & 131.13. When such a "performance-based" approach is sufficiently detailed and has suitable safeguards to ensure predictable, repeatable outcomes, EPA approval of such an approach can also serve as approval of the outcomes as well."

Iowa's Adoption of the WER and Comparison of WER and BLM Results

In addition to adoption of the BLM, Iowa has adopted the option to calculate site-specific copper criteria using WERs that modify Iowa's existing hardness-based copper criterion. Iowa notes that in its BLM *Implementation Procedures* document that "[i]f adequate site-specific water

[1] Available at https://www.epa.gov/wqc/supplementary-training-materials-aquatic-life-criteria-copper.

chemistry data that meet the requirements specified in this document are collected, the copper BLM criteria will be developed and used in wasteload allocations to derive water quality based limits." Based on this assertion, combined with the fact that the cost to collect representative water samples and analyze the ten chemical parameters to run the copper BLM is generally lower than the cost to run the toxicity tests involved in deriving WER-based criteria, the EPA anticipates that Iowa will rely principally on the BLM.

As noted above, the BLM reflects the best available science on copper bioavailability and toxicity with which to develop protective copper criteria. When the EPA receives WER-based site-specific copper criteria to review and approve or disapprove, the EPA's obligation is to make an approval or disapproval decision based on whether the criteria protect the designated uses and are based on a sound scientific rationale.[2] Typically, the EPA will use the copper BLM to evaluate the protectiveness of submitted copper WER-based criteria. Comparing the submitted WER-based criteria values with criteria values calculated using the copper BLM, using data from the site in question, is a reasonable and appropriate method for the EPA to evaluate whether WER-based criteria submitted by states and authorized tribes are protective and scientifically defensible. The EPA strongly encourages the IDNR to similarly use the copper BLM to evaluate the validity of any WER-based results. When the data from the WER studies do not contain all of the input parameters required to run the copper BLM, the EPA recommends that the state estimate inputs for the missing parameters for those samples based on the best available information about the site. This could include using ecoregional estimates. [See the EPA's draft *Technical support document: Recommended Estimates for Missing Water Quality Parameters for Application in EPA 's Biotic Ligand Model.* (EPA 820-R-15-106), March 2016].

In summary, the EPA recommends new copper criteria be calculated using the BLM. However, if entities are interested in conducting a WER study to calculate criteria, the water quality characteristics needed to calculate BLM-based criteria should be measured and reported for each of these samples. These data should then be used to calculate BLM-based criteria to determine if the WER-based criteria are similar to and as protective as, the BLM-based criteria. Validation of the WER results using the BLM could reveal any need for further sampling and significantly raise the level of confidence in the results.

PUBLIC AVAILABILITY OF INFORMATION

In its BLM *Implementation Procedures* document, the IDNR stated:

> *"The Sites where copper BLM based criteria have been developed will be published on the IDNR website."*

[2] The CWA describes the EPA's authority to review and approve or disapprove state and authorized tribal WQS at CWA 303(c). The WQS regulation provides that "Under section 303(c) of the Act, the EPA is to review and approve or disapprove State-adopted water quality standards. The review involves a determination of ... Whether the State has adopted criteria that protect the designated water uses based on a sound scientific rationale consistent with § 131.11." (40 CFR 131.5(a)]

The EPA commends Iowa for ensuring transparency in its calculation of site-specific copper criteria based on the BLM. The EPA expects the IDNR to similarly publish on its website the location of sites where WER-based copper criteria have been developed.

The EPA's Action on Iowa's Copper Criteria

The EPA has completed its review of subrule 61.3(3) Table 1, footnote (n) and subrule 61.3(10), and finds that these new and revised provisions comport with the requirements of CWA section 303(c) and 40 CFR 131, and hereby approves these provisions. This approval provides the State with additional flexibility and options for developing and implementing site-specific criteria for copper.

The preamble to the "Alaska Rule" (65 FR 24641) notes this about performance-based approaches: "When EPA reviews the results of a State or authorized Tribes' triennial review, EPA expects to evaluate a representative subset of the site-specific decisions to ensure that the State or authorized Tribe is adhering to the EPA approved procedure." The EPA looks forward to working with Iowa during its next triennial review to jointly review a sample of the site-specific copper criteria that Iowa calculates using its newly approved copper criteria methods.